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# (12) United States Patent

# Das et al.

## (54) AUTONOMOUS VEHICLE POSITIONING SYSTEM FOR MISBEHAVIOR DETECTION

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(58) Field of Classification Search

See application file for complete search history.

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### (57) ABSTRACT

An autonomous vehicle positioning system for determining a position of a remote vehicle relative to a mobile host vehicle based on safety alert messages broadcast from the remote vehicle relating to an event in a road of travel. A host vehicle communication unit communicates with the remote vehicle for receiving the broadcast messages from the remote vehicle. A host vehicle control unit identifies reference points along the road of travel. Each reference point identifies a position of the host vehicle and associated signal reception properties, for example time-of-arrival, angle-of-arrival and received signal strength when the host vehicle receives the broadcast message. The control unit of the host vehicle selects a set of the reference points having identified positions and associated times, angles and signal strength. The control unit determines a position of the remote vehicle as a function of the time difference-of-arrival, angle-of-arrival or received signal strength between each selected reference point in the set.

## 24 Claims, 4 Drawing Sheets

